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**Constellation  
Energy Group**

September 17, 2002

U.S. Nuclear Regulatory Commission  
Washington, DC 20555

**ATTENTION:** Document Control Desk

**SUBJECT:** Calvert Cliffs Nuclear Power Plant  
Unit No. 1; Docket No. 50-317; License No. DPR 53  
Licensee Event Report 2002-003  
Reactor Trip Due to Loss of Reactor Coolant Pump Motor Oil

The attached report is being sent to you as required under 10 CFR 50.73 guidelines. Should you have questions regarding this report, we will be pleased to discuss them with you.

Very truly yours,

for  
Kevin J. Nietmann  
Plant General Manager

KJN/MJY/bjd

Attachment

cc: J. Petro, Esquire  
J. E. Silberg, Esquire  
Director, Project Directorate I-1, NRC  
D. M. Skay, NRC

H. J. Miller, NRC  
Resident Inspector, NRC  
R. I. McLean, DNR

IE22

## LICENSEE EVENT REPORT (LER)

(See reverse for required number of  
digits/characters for each block)

APPROVED BY OMB NO. 3150-0104 EXPIRES 7-31-2004

Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet e-mail to: bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

## 1. FACILITY NAME

Calvert Cliffs Nuclear Power Plant, Unit 1

## 2. DOCKET NUMBER

05000 317

## 3. PAGE

1 OF 04

## 4. TITLE

Reactor Trip Due to Loss of Reactor Coolant Pump Motor Oil

## 5. EVENT DATE

MO	DAY	YEAR
07	24	02

## 6. LER NUMBER

YEAR	SEQUENTIAL NUMBER	REV NO
2002	- 03	- 00

## 7. REPORT DATE

MO	DAY	YEAR
09	17	2002

## 8. OTHER FACILITIES INVOLVED

## FACILITY NAME

## DOCKET NUMBER

05000

## FACILITY NAME

## DOCKET NUMBER

05000

9. OPERATING  
MODE

1

10. POWER  
LEVEL

100

## 11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 19. (Check all that apply)

20.2201(b)

20.2203(a)(3)(ii)

50.73(a)(2)(ii)(B)

50.73(a)(2)(ix)(A)

20.2201(d)

20.2203(a)(4)

50.73(a)(2)(iii)

50.73(a)(2)(x)

20.2203(a)(1)

50.36(c)(1)(i)(A)

X

50.73(a)(2)(iv)(A)

73.71(a)(4)

20.2203(a)(2)(i)

50.36(c)(1)(ii)(A)

50.73(a)(2)(v)(A)

73.71(a)(5)

20.2203(a)(2)(ii)

50.36(c)(2)

50.73(a)(2)(v)(B)

OTHER  
Specify in Abstract below or in  
NRC Form 366A

20.2203(a)(2)(iii)

50.46(a)(3)(ii)

50.73(a)(2)(v)(C)

20.2203(a)(2)(iv)

50.73(a)(2)(i)(A)

50.73(a)(2)(v)(D)

20.2203(a)(2)(v)

50.73(a)(2)(i)(B)

50.73(a)(2)(vii)

20.2203(a)(2)(vi)

50.73(a)(2)(i)(C)

50.73(a)(2)(viii)(A)

20.2203(a)(3)(i)

50.73(a)(2)(ii)(A)

50.73(a)(2)(viii)(B)

## 12. LICENSEE CONTACT FOR THIS LER

## NAME

M. J. Yox

## TELEPHONE NUMBER (Include Area Code)

410-495-6652

## 13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU- FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU- FACTURER	REPORTABLE TO EPIX
B	AB	ND	W12D	Y					

## 14. SUPPLEMENTAL REPORT EXPECTED

YES (If yes, complete EXPECTED SUBMISSION DATE)

X

NO

15. EXPECTED  
SUBMISSION  
DATE

## MONTH

## DAY

## YEAR

## 16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On July 24, 2002, at approximately 1338 hours, Unit 1 received a low level alarm on 11A Reactor Coolant Pump (RCP) motor upper bearing oil reservoir. At approximately 1620 hours, Unit 1 Control Room Supervisor ordered a rapid downpower of Unit 1 in response to indications of increasing RCP motor thrust bearing temperatures. At 1628 hours, the Unit 1 Control Room Supervisor ordered a manual trip of Unit 1 when 11A RCP motor thrust bearing temperature reached 195 degrees Fahrenheit, in accordance with plant operating instructions. Unit 1 was manually tripped and all systems responded satisfactorily, with the exception of a turbine bypass valve, which closed slowly, causing Unit 1 Steam Generator pressures to approach the point of operator action to shut the main steam isolation valves.

This event was caused by the failure of a butt weld on an RCP motor oil cooler line. The weld failure resulted in a through-wall crack that allowed lubricating oil to drain from the reservoir. This loss of oil resulted in oil starvation of the thrust bearing and subsequent overheating of the RCP motor thrust bearing.

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		2002	- 003	- 00	

17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

**I. DESCRIPTION OF EVENT**

On July 24, 2002, at approximately 1338 hours, the Unit 1 Control Room Operator received a low level alarm on 11A Reactor Coolant Pump (RCP) motor upper bearing oil reservoir. At approximately 1620 hours, with both Unit 1 and Unit 2 at 100 percent rated power, the Unit 1 Control Room Supervisor ordered a rapid downpower of Unit 1 in response to indications of increasing 11A RCP motor thrust bearing temperature. The Unit 1 Control Room Supervisor subsequently ordered a manual trip of Unit 1 Reactor at 1628 hours when 11A RCP motor thrust bearing temperature reached 195 degrees Fahrenheit, in accordance with Operating Instruction-1A, "Reactor Coolant System and Pump Operations." The Unit 1 Control Room Operator manually tripped Unit 1 from 98 percent rated thermal power and implemented Emergency Operating Procedure-0, "Post-Trip Immediate Actions." All equipment responded satisfactorily to the trip except for Turbine Bypass Valve 1-CV-3940, which appeared to have momentarily stuck open, causing Unit 1 Steam Generator pressures to approach the point of operator action to shut the main steam isolation valves.

No structures, systems, or components were inoperable at the start of the event that would have contributed to the event. This event is only applicable to Unit 1 because the failure was identified as a weld failure specific to an oil return line on 11A RCP motor.

**II. CAUSE OF EVENT**

The immediate physical cause of this event was identified as the failure of a butt weld on the oil return line from the oil cooler on 11A RCP motor. The weld failure resulted in a through-wall crack that extended approximately one-third of the circumference of the pipe. This crack allowed the lubricating oil to drain from the reservoir, which resulted in oil starvation of the thrust bearing and subsequent overheating. The immediate physical cause of the butt weld failure was a high cycle fatigue failure resulting from the lack of full penetration in the weld.

An additional cause identified during the root cause investigation was the failure to identify and correct the weld deficiency prior to this event. A Unit 2 forced outage on October 25, 2001 was the result of a similar butt weld failure on component cooling water piping to the 22A RCP motor upper bearing oil reservoir. One of the corrective actions from the Unit 2 forced outage was to inspect all other similar butt welds in Unit 1 RCPs, and to replace any welds identified without full penetration welds. The failed butt weld on the 11A RCP motor oil cooler return line that caused the subject event was in the population of welds requiring inspection, however, the weld was not inspected. An underlying cause for the trip was a failure by station personnel to use a systematic method to identify and pre-emptively repair all of the affected Unit 1 RCP motor butt welds.

**III. ANALYSIS OF EVENT**

This event is reportable because of the resulting manual actuation of a valid reactor trip, in accordance with 10 CFR 50.73(a)(2)(iv)(a). No actual safety consequences resulted from this event because all required safety systems were available and functioned as designed, with the

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17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

exception of Turbine Bypass Valve 1-CV-3940. The valve appeared to have momentarily stuck open, causing Unit 1 Steam Generator pressures to approach the point of operator action to shut the main steam isolation valves. Further investigation revealed the turbine bypass valve did not stick open, but stroked shut from full open very slowly due to a mispositioned air valve in its positioner. The valve then operated normally, minimizing the impact to plant safety. Operator action would have been required to prevent excessive cooldown and reactivity addition if 1-CV-3940 had not shut and returned to normal operation.

The overheating of the RCP motor bearing did not cause any actual safety consequences because the reactor was manually tripped prior to securing the pump. The pump continued to perform its safety function of providing forced flow for heat transport to an operable steam generator prior to the trip. Only one RCP is required in each Reactor Coolant System loop for operability in Mode 3, therefore the Reactor Coolant System safety functions were met with 11B RCP still running to allow decay heat removal after the reactor trip.

**IV. CORRECTIVE ACTIONS**

- A. Each of the stub pipe butt welds on the oil return lines next to the motor for the four Unit 1 RCPs were inspected. The failed weld on the 11A RCP motor was repaired. A weld bead was found on the inside diameter of the similar weld on two other pump motors, and the plant added a weld bead to the inside diameter of the same weld on the fourth pump motor. These four welds are recommended for replacement with full penetration welds during the next Unit 1 Refueling Outage.
- B. Review the inspections performed on Unit 2 RCP motor oil return line butt welds to ensure that all similar welds have been inspected or are on schedule for inspection at the next refueling outage.
- C. Adopt an event free tools program in Plant Engineering Section based on models successfully adopted in Operations and Maintenance Sections at Calvert Cliffs Nuclear Power Plant.
- D. Conduct an effectiveness evaluation of the corrective actions to ensure that:
  1. all applicable butt welds have been found, inspected, and replaced if necessary; and
  2. the use of event free tools in Plant Engineering Section reduces the rate of human performance errors.

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17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

**V. ADDITIONAL INFORMATION**

**A. Component Identification**

Component	IEEE 803 EIS Function	IEEE 805 System ID
Reactor Coolant Pump Motor 11A	MO	AB
RCP Motor 11A Oil Return Line	PSF	AB

- B.** Calvert Cliffs Nuclear Power Plant has not experienced any similar reactor trips or reportable events due to RCP motor oil leakage or bearing failures. A forced outage occurred on October 25, 2001 due to a similar weld related failure on a component cooling water line to the 22A RCP motor upper bearing oil cooler. Ineffective corrective actions taken after the October 2001 event have been identified as contributing to the current event.

- C.** Energy Industry Identification System (EIS) component function identifier and system names of each component or system referred to in this licensee event report are as follows:

Component	EIS Function	EIS System ID
Turbine Bypass Valve (1-TBV-3940)	V	J1
RCP Oil Reservoir Level Transmitter	LT	AB
Main Steam Isolation Valve	ISV	TA
Component Cooling Water Piping	PSF	CC